

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-22 (canceled).

23. (new) A method for identifying when a driver of a vehicle is not paying attention, the method comprising the acts of:

detecting movement of a steering wheel of the vehicle as a steering wheel angle x ;

identifying a steering quiescent phase;

determining a magnitude of an extent of the steering quiescent phase by evaluating at least one of the steering wheel angle x and a rate of change of the steering wheel angle x ;

identifying a steering action following the steering quiescent phase and determining a magnitude of an extent of the steering action by evaluating the rate of change of the steering wheel angle x ; and

assessing a result of a logical link between the extent of the steering quiescent phase and the extent of the steering action to determine a measure of a severity of inattentiveness by the driver while steering the vehicle.

24. (new) The method as claimed in claim 23, wherein the extent of the steering quiescent phase is determined for at least one of a time $t_1 - \Delta t$ in a form of

a first steering wheel angle fluctuation and for a time t_1 in a form of a second steering wheel fluctuation, in each case based on the detected steering wheel angle x .

25. (new) The method as claimed in claim 24, wherein:

the first steering wheel angle fluctuation is calculated in the form of a steering wheel angle variance $v(x, t_1 - \Delta t)$ using the following formula:

$$v(x, t_1 - \Delta t) = \text{var}(x(t_1 - \Delta t), \dots, x(t_1 - \Delta t - T)) = \frac{1}{T} \sum_{t=(t_1 - \Delta t)}^{((t_1 - \Delta t) - T)} (x(t) - \bar{x})^2$$

where:

$x(t_1 - \Delta t)$ represents the steering wheel angle x at the time $t_1 - \Delta t$;

Δt represents a multiple of the sampling interval;

T represents an observation time window;

$t_1 - \Delta t$ represents an observation time;

\bar{x} represents a mean time value of the steering wheel angle x averaged over the observation time window T ; and

var represents a mathematical variance function; and

the second steering wheel angle fluctuation in the form of a steering wheel angle variance $v(x, t_1)$ is calculated using the following formula:

$$v(x, t_1) = \text{var}(x(t_1), \dots, x(t_1 - T)) = \frac{1}{T} \sum_{t=(t_1)}^{(t_1 - T)} (x(t) - \bar{x})^2$$

where the variables have the same meanings.

26. (new) The method as claimed in claim 25, wherein the extent of the steering action, and the logical linking of the steering quiescent phase and the steering action, are determined by formation of a variance ratio $vv(x, t_1)$ as a quotient of the second steering wheel angle variance divided by the first.

27. (new) The method as claimed in claim 26, wherein the variance ratio $vv(x, t_1)$ is calculated in accordance with the following formula:

$$vv(x, t_1) = \frac{v(x, t_1)}{v(x, t_1 - \Delta t)}.$$

28. (new) The method as claimed in claim 23, wherein the extent of the steering quiescent phase is determined as that time period during which the steering wheel angle remains within a predetermined steering wheel angle interval (Δx).

29. (new) The method as claimed in claim 28, wherein the steering wheel angle interval is predetermined on a basis of a current speed of the vehicle.

30. (new) The method as claimed in claim 28, wherein the extent of the steering action following a previous steering quiescent phase is determined in the form of a maximum gradient of the steering wheel angle which then occurs.

31. (new) The method as claimed in claim 30, wherein the logical link between the extent of the steering quiescent phase and the extent of the steering action at a time t_1 is produced by using a multidimensional operator only when the extent of the steering quiescent phase in the form of its time period is greater than a predetermined minimum time period and the maximum gradient of the steering wheel angle exceeds a predetermined gradient threshold value.

32. (new) The method as claimed in claim 31, wherein the multidimensional operator represents a family of characteristics, a weighting function or a logical decision function.

33. (new) The method as claimed in claim 31, wherein the multidimensional operator is dimensioned on the basis of at least one of a vehicle speed and a driver's driving style dynamics.

34. (new) The method as claimed in claim 32, wherein the multidimensional operator is dimensioned on the basis of at least one of a vehicle speed and a driver's driving style dynamics.

35. (new) The method as claimed in claim 26, wherein in a subsequent act, a result of the logical link operation is mapped in the form of the variance ratio $vv(x, t)$ or of a multidimensional operator, with the aid of a sigmoid function, onto a probability value $P(U_1)$ between 0 and 100%, which represents the inattentiveness by the driver in steering the vehicle at the time t_1 .

36. (new) The method as claimed in claim 31, wherein in a subsequent act, a result of the logical link operation is mapped in the form of the variance ratio $vv(x, t)$ or of a multidimensional operator, with the aid of a sigmoid function, onto a probability value $P(U_1)$ between 0 and 100%, which represents the inattentiveness by the driver in steering the vehicle at the time t_1 .

37. (new) The method as claimed in claim 35, wherein for further assessing driver fatigue, the method further comprising the acts of:

determining a first probability vector $O_{n=1}$, whose elements $O_{n=1,k1}$ each represent probability values $P(O_{1,k1})$, of the probability value $P(U_1)$ occurring in individual, predetermined and selected extent levels k_1 , where $k_1 \in \{1 \dots K_1\}$; and

determining a fatigue probability vector S' , whose elements each represent fatigue level probabilities P , of the detected inattentiveness by the driver in steering the vehicle being associated with individual, predetermined and suitably selected fatigue levels, using the following formula:

$$S'(t) = O_1^T \cdot B_1;$$

with

O_1^T representing a transpose of the first probability vector;

B_1 a matrix B representing predetermined conditional probabilities with respect to the inattentiveness, represented by the indicator $n = 1$; and

K_1 representing the number of extent levels for the indicator $n = 1$.

38. (new) The method as claimed in claim 36, wherein for further assessing driver fatigue, the method further comprising the acts of:

determining a first probability vector $O_{n=1}$, whose elements $O_{n=1,k1}$ each represent probability values $P(O_{1,k1})$, of the probability value $P(U_1)$ occurring in individual, predetermined and selected extent levels k_1 , where $k_1 \in \{1 \dots K_1\}$; and

determining a fatigue probability vector S' , whose elements each represent fatigue level probabilities P , of the detected inattentiveness by the driver in steering the vehicle being associated with individual, predetermined and suitably selected fatigue levels, using the following formula:

$$S'(t) = O_1^T \cdot B_1;$$

with

O_1^T representing a transpose of the first probability vector;

B_1 a matrix B representing predetermined conditional probabilities with respect to the inattentiveness, represented by the indicator $n = 1$; and

K_1 representing the number of extent levels for the indicator $n = 1$.

39. (new) The method as claimed in claim 37, further comprising the acts of:

determining further probability vectors $O_{n=2} \dots O_{n=N}$, whose elements $O_{n,kn}$ were $k_n = 1 \dots K_n$, each representing probabilities $P(O_{n,kn})$ of the probability values $P(U_n)$ occurring for other inattentiveness indicators $n = 2 \dots N$ for the driver, in

addition to the steering inattentiveness $n = 1$ and an eyelid closure behavior $n = 2$ or a reaction time $n = 3$, in individual extent levels k_n , which are predetermined individually for the inattentiveness indicators, and

calculating the fatigue probability vector S'' using the following formula:

$$S''(t) = \prod_{n=1}^N O_n^T \cdot B_n$$

where

- N represents the n -th indicator for the inattentiveness by the driver;
- O_n^T represents the transpose of the further probability vectors;
- B_n represents the matrix B for the indicator n ; and
- N represents the number of indicators.

40. (new) The method as claimed in claim 38, further comprising the acts of:

determining further probability vectors $O_{n=2} \dots O_{n=N}$, whose elements $O_{n,kn}$ were $k_n = 1 \dots K_n$, each representing probabilities $P(O_{n,kn})$ of the probability values $P(U_n)$ occurring for other inattentiveness indicators $n = 2 \dots N$ for the driver, in addition to the steering inattentiveness $n = 1$ and an eyelid closure behavior $n = 2$ or a reaction time $n = 3$, in individual extent levels k_n , which are predetermined individually for the inattentiveness indicators, and

calculating the fatigue probability vector S'' using the following formula:

$$S''(t) = \prod_{n=1}^N O_n^T \cdot B_n$$

where

N represents the n -th indicator for the inattentiveness by the driver;

O_n^T represents the transpose of the further probability vectors;

B_n represents the matrix B for the indicator n ; and

N represents the number of indicators.

41. (new) The method as claimed in claim 37, further comprising:
storing the fatigue probability vector $S'''(t-1)$; and
calculating a more precise fatigue probability vector $S'''(t)$ using the
following formula:

$$S'''(t) = S''(t) \cdot A \cdot S'''(t-1),$$

where

A represents a matrix of conditional probabilities between a fatigue
level from a previous time step and a current fatigue level.

42. (new) The method as claimed in claim 39, further comprising:
storing the fatigue probability vector $S'''(t-1)$; and
calculating a more precise fatigue probability vector $S'''(t)$ using the
following formula:

$$S'''(t) = S''(t) \cdot A \cdot S'''(t-1),$$

where

A represents a matrix of conditional probabilities between a fatigue level from a previous time step and a current fatigue level.

43. (new) The method as claimed in claim 39, wherein, in addition to the steering inattentiveness and optional further indicators for the inattentiveness by the driver, the method determines whether the driver is holding a conversation or is using a control element; and

further wherein said events are evaluated using a probabilistic model in order to make a statement about the probability with which it is assumable that the driver has been distracted, on the basis of the conversation or the control action, and the probability of driver fatigue being the cause of such observed inattentiveness.

44. (new) The method as claimed in claim 41, wherein, in addition to the steering inattentiveness and optional further indicators for the inattentiveness by the driver, the method determines whether the driver is holding a conversation or is using a control element; and

further wherein said events are evaluated using a probabilistic model in order to make a statement about the probability with which it is assumable that the driver has been distracted, on the basis of the conversation or the control

action, and the probability of driver fatigue being the cause of such observed inattentiveness.

45. (new) The method as claimed in claim 26, wherein:

the logical link operation is carried out at different times t_i , where $i = 1-I$ during a predetermined measurement time interval;

results of the logical operations relating to the times t_i are, in each case, stored together with associated weighting factors which represent the driving situation of the vehicle or the current distraction of the driver, in each case relating to the time t_i ; and

a weighted result of the logical operation is calculated by arithmetic averaging of the results stored during the measurement time interval, taking into account the associated weighting factors.

46. (new) The method as claimed in claim 45, wherein the weighting factors are calculated taking into account at least one of circadian influencing factors and the time since a journey started.

47. (new) The method as claimed in claim 45, further comprising:

outputting information, in a form of an audible or visual warning message to the driver of the vehicle, when the preferably weighted result exceeds a predetermined threshold value.

48. (new) A computer product, comprising a computer readable medium having program code for a controller for identifying inattentiveness by a driver of a vehicle, wherein the program code performs the method of claim 23.

49. (new) A data storage medium, comprising the computer product as claimed in claim 48.

50. (new) A controller for identifying inattentiveness by a driver of a vehicle, comprising:

a steering wheel angle sensor for detecting a current steering wheel angle of the vehicle;

a microcontroller control unit for carrying out the method as claimed in claim 23 in response to the detected steering wheel angle; and

a warning device for outputting audible and/or visual warning information to the driver when inattentiveness has been found when carrying out the method by the microcontroller control unit.